	Type	Hits	Search Text	DBs
1	BRS	1700	429/12,40,44.ccls.	USPAT; US-PGPUB
2	BRS	6	(fuel adj cell) and Yamaura.in.	USPAT; US-PGPUB
3	BRS	2072	carbon adj nanotube	USPAT; US-PGPUB; EPO; DERWENT
4	BRS	19	(carbon adj nanotube) with (vapor adj grown adj carbon adj fiber)	USPAT; US-PGPUB; EPO; DERWENT
5	BRS	10	((carbon adj nanotube) with (vapor adj grown adj carbon adj fiber)) and (fuel adj cell)	USPAT; US-PGPUB; EPO; DERWENT
6	BRS	10	(((carbon adj nanotube) with (vapor adj grown adj carbon adj fiber)) and (fuel adj cell)) not ((fuel adj cell) and Yamaura.in.)	USPAT; US-PGPUB; EPO; DERWENT
7	BRS	57	(carbon adj nanotube) and (vapor adj grown adj carbon adj fiber)	USPAT; US-PGPUB; EPO; DERWENT
8	BRS	13	((carbon adj nanotube) and (vapor adj grown adj carbon adj fiber)) and (fuel adj cell)	USPAT; US-PGPUB; EPO; DERWENT
9	BRS	3	(((carbon adj nanotube) and (vapor adj grown adj carbon adj fiber)) and (fuel adj cell)) not ((((carbon adj nanotube) with (vapor adj grown adj carbon adj fiber)) and (fuel adj cell)) not ((fuel adj cell) and Yamaura.in.))	USPAT; US-PGPUB; EPO; DERWENT
10	BRS	792	toho adj rayon	USPAT; US-PGPUB; EPO; DERWENT
11	BRS	1	(toho adj rayon) near carbon	USPAT; US-PGPUB; EPO; DERWENT
12	BRS	142	(toho adj rayon) with carbon	USPAT; US-PGPUB; EPO; DERWENT
13	BRS	0	(toho adj rayon) with vapor	USPAT; US-PGPUB; EPO; DERWENT

	Type	Hits	Search Text	DBs
14	BRS	214	vapor adj grown adj carbon adj fiber	USPAT; US-PGPUB; EPO; DERWENT
15	BRS	232	vapor adj grown adj3 fiber	USPAT; US-PGPUB; EPO; DERWENT
16	BRS	1	6589682.pn.	USPAT; US-PGPUB
17	BRS	1	6589682.pn. and thickness	USPAT; US-PGPUB
18	BRS	104055	vapor adj2 grown ad carbon adj fiber	USPAT; US-PGPUB
19	BRS	132	(vapor adj2 grown ad carbon adj fiber) with (gas adj diffusion)	USPAT; US-PGPUB
20	BRS	106	((vapor adj2 grown ad carbon adj fiber) with (gas adj diffusion)) and 429/$.ccls.	USPAT; US-PGPUB
21	BRS	59	(((vapor adj2 grown ad carbon adj fiber) with (gas adj diffusion)) and 429/$.ccls.) and @ad<20000929	USPAT; US-PGPUB
22	BRS	206	vapor adj2 grown adj carbon adj fiber	USPAT; US-PGPUB
23	BRS	0	(vapor adj2 grown adj carbon adj fiber) with (gas adj diffusion)	USPAT; US-PGPUB
24	BRS	0	(vapor adj2 grown adj carbon adj fiber) same (gas adj diffusion)	USPAT; US-PGPUB
25	BRS	17	(vapor adj2 grown adj carbon adj fiber) with electrode	USPAT; US-PGPUB
26	BRS	12	((vapor adj2 grown adj carbon adj fiber) with electrode) and	USPAT; US-PGPUB
27	BRS	2072	carbon adj nanotube	USPAT; US-PGPUB; EPO; DERWENT
28	BRS	33	(carbon adj nanotube) with fibrous	USPAT; US-PGPUB; EPO; DERWENT

```
=> s carbon nanotube (s) gas diffusion
       1009223 CARBON
         22544 CARBONS
       1017512 CARBON
                 (CARBON OR CARBONS)
         10025 NANOTUBE
         11978 NANOTUBES
         12400 NANOTUBE
                 (NANOTUBE OR NANOTUBES)
          9523 CARBON NANOTUBE
                 (CARBON(W)NANOTUBE)
       1312628 GAS
        452737 GASES
       1476645 GAS
                 (GAS OR GASES)
        464870 DIFFUSION
          1445 DIFFUSIONS
        465281 DIFFUSION
                 (DIFFUSION OR DIFFUSIONS)
          6928 GAS DIFFUSION
                 (GAS(W)DIFFUSION)
L1            2 CARBON NANOTUBE (S) GAS DIFFUSION

=> d l1 abs ibib 1-2

L1   ANSWER 1 OF 2  CAPLUS  COPYRIGHT 2003 ACS on STN
AB   The invention is about a novel design and process for: (a) a membrane
     electrode assembly (MEA) with aligned carbon nanotubes
     as a nano-scale gas distributor which yield better gas conversion
     efficiencies in PEM fuel cells, and (b) doped silicon flow field plates
     (FFP) which increase electrode cond. of the membrane-catalyst-gas
     diffusion layer (GDL)-FFP interfaces of the proton exchange
     membrane fuel cell (PEMFC). Also, part of the invention are a stacking
     configuration and a gas distribution design that also enhance cond. of
     carbon/metal catalyst/electrode, GDL, and FFP interfaces surfaces without
     crushing the FFPs. Aligned carbon nanoscale gas distributors are employed
     at the interfaces, thereby increasing the overall performance of the
     PEMFC. The FFPs are easy to manuf. and mass-producible, yet mech. sturdy
     and significantly lighter in weigh than their conventional counterparts.
     Another novel feature of the invention is an integrated monitoring and
     communication/internet system located directly or connected to the FFP.
ACCESSION NUMBER:         2003:523991  CAPLUS
DOCUMENT NUMBER:          139:71613
TITLE:                    Fuel cells incorporating nanotubes in fuel feed
INVENTOR(S):              Fleckner, Karen; Zheng, Feng; Buenviaje, Cynthia;
                          Huang, Yao; Pedersen, Jeff; Lim, David; Fuji, H. Sho;
                          Hergesheimer, Jeremy; Treiber, Michael
PATENT ASSIGNEE(S):       USA
SOURCE:                   U.S., 16 pp.
                          CODEN: USXXAM
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
     ---------------   ----  --------       ---------------  --------
     US 6589682         B1   20030708       US 2000-642198   20000818
PRIORITY APPLN. INFO.:                   US 2000-178494P  P  20000127
REFERENCE COUNT:          4     THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS
                                RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1   ANSWER 2 OF 2  CAPLUS  COPYRIGHT 2003 ACS on STN
AB   The electrode is prepd. by applying a catalyst-fibrous carbonaceous
```

material dispersion on a carbon sheet to form a catalyst layer. The electrochem. device, e.g., an air battery or a fuel cell, is prepd. by attaching an electrolyte layer to a gas diffusion electrode having the above catalyst layer.

ACCESSION NUMBER: 2002:273011 CAPLUS
DOCUMENT NUMBER: 136:297431
TITLE: Manufacture of gas diffusion electrode and electrochemical device
INVENTOR(S): Kanemitsu, Toshiaki; Sato, Nobuaki; Imazato, Minehisa
PATENT ASSIGNEE(S): Sony Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002110178	A2	20020412	JP 2000-298852	20000929

PRIORITY APPLN. INFO.: JP 2000-298852 20000929

```
=> s vapor grown carbon (s) gas diffusion
        442728 VAPOR
         67235 VAPORS
        482775 VAPOR
                 (VAPOR OR VAPORS)
        299387 GROWN
             8 GROWNS
        299394 GROWN
                 (GROWN OR GROWNS)
       1009223 CARBON
         22544 CARBONS
       1017512 CARBON
                 (CARBON OR CARBONS)
           345 VAPOR GROWN CARBON
                 (VAPOR(W)GROWN(W)CARBON)
       1312628 GAS
        452737 GASES
       1476645 GAS
                 (GAS OR GASES)
        464870 DIFFUSION
          1445 DIFFUSIONS
        465281 DIFFUSION
                 (DIFFUSION OR DIFFUSIONS)
          6928 GAS DIFFUSION
                 (GAS(W)DIFFUSION)
L2           0 VAPOR GROWN CARBON (S) GAS DIFFUSION

=> s vapor grown carbon (p) gas diffusion
        442728 VAPOR
         67235 VAPORS
        482775 VAPOR
                 (VAPOR OR VAPORS)
        299387 GROWN
             8 GROWNS
        299394 GROWN
                 (GROWN OR GROWNS)
       1009223 CARBON
         22544 CARBONS
       1017512 CARBON
                 (CARBON OR CARBONS)
           345 VAPOR GROWN CARBON
```

```
                (VAPOR(W)GROWN(W)CARBON)
       1312628 GAS
        452737 GASES
       1476645 GAS
                (GAS OR GASES)
        464870 DIFFUSION
          1445 DIFFUSIONS
        465281 DIFFUSION
                (DIFFUSION OR DIFFUSIONS)
          6928 GAS DIFFUSION
                (GAS(W)DIFFUSION)
L3             0 VAPOR GROWN CARBON (P) GAS DIFFUSION

=> s carbon nanotube (p) gas diffusion
       1009223 CARBON
         22544 CARBONS
       1017512 CARBON
                (CARBON OR CARBONS)
         10025 NANOTUBE
         11978 NANOTUBES
         12400 NANOTUBE
                (NANOTUBE OR NANOTUBES)
          9523 CARBON NANOTUBE
                (CARBON(W)NANOTUBE)
       1312628 GAS
        452737 GASES
       1476645 GAS
                (GAS OR GASES)
        464870 DIFFUSION
          1445 DIFFUSIONS
        465281 DIFFUSION
                (DIFFUSION OR DIFFUSIONS)
          6928 GAS DIFFUSION
                (GAS(W)DIFFUSION)
L4             4 CARBON NANOTUBE (P) GAS DIFFUSION

=> d l4 abs ibib 1-2

L4   ANSWER 1 OF 4  CAPLUS  COPYRIGHT 2003 ACS on STN
AB   The invention is about a novel design and process for: (a) a membrane
     electrode assembly (MEA) with aligned carbon nanotubes
     as a nano-scale gas distributor which yield better gas conversion
     efficiencies in PEM fuel cells, and (b) doped silicon flow field plates
     (FFP) which increase electrode cond. of the membrane-catalyst-gas
     diffusion layer (GDL)-FFP interfaces of the proton exchange
     membrane fuel cell (PEMFC).  Also, part of the invention are a stacking
     configuration and a gas distribution design that also enhance cond. of
     carbon/metal catalyst/electrode, GDL, and FFP interfaces surfaces without
     crushing the FFPs.  Aligned carbon nanoscale gas distributors are employed
     at the interfaces, thereby increasing the overall performance of the
     PEMFC.  The FFPs are easy to manuf. and mass-producible, yet mech. sturdy
     and significantly lighter in weigh than their conventional counterparts.
     Another novel feature of the invention is an integrated monitoring and
     communication/internet system located directly or connected to the FFP.
ACCESSION NUMBER:         2003:523991  CAPLUS
DOCUMENT NUMBER:          139:71613
TITLE:                    Fuel cells incorporating nanotubes in fuel feed
INVENTOR(S):              Fleckner, Karen; Zheng, Feng; Buenviaje, Cynthia;
                          Huang, Yao; Pedersen, Jeff; Lim, David; Fuji, H. Sho;
                          Hergesheimer, Jeremy; Treiber, Michael
PATENT ASSIGNEE(S):       USA
SOURCE:                   U.S., 16 pp.
                          CODEN: USXXAM
DOCUMENT TYPE:            Patent
```

LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6589682	B1	20030708	US 2000-642198	20000818

PRIORITY APPLN. INFO.: US 2000-178494P P 20000127
REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2003 ACS on STN
AB Multi walled **carbon nanotubes** are mixed with polycarbonate powder and blended in a rotational shear field. Sets of specimens are then molded with a **carbon nanotube** vol. fraction of 1.27% and 4.75%. Afterwards, these composites are processed using a **gas diffusion** technique in which carbon dioxide is the foaming agent. With this technique, a low-d. microstructure which contains a microcellular microstructure of closed cells surrounded by a solid skin layer, can be manufd. Raman spectroscopy is applied on a fracture surface of the foamed composite. The spectrums confirm the presence of **carbon nanotubes** throughout the specimen.
ACCESSION NUMBER: 2003:60777 CAPLUS
DOCUMENT NUMBER: 139:101794
TITLE: Carbon nanotube reinforced microcellular polycarbonate
AUTHOR(S): Nygaard, Jens Vinge; Pyrz, Ryszard
CORPORATE SOURCE: Institute of Mechanical Engineering, Aalborg University, Aalborg, 9220, Den.
SOURCE: Composite Systems: Macrocomposites, Microcomposites, Nanocomposites, Proceedings of the ACUN-4, International Composites Conference, 4th, Sydney, Australia, July 21-25, 2002 (2002), 345-350. Editor(s): Bandyopadhyay, Sri; Gowripalan, N.; Rizkalla, Sami. University of New South Wales: Sydney, Australia.
CODEN: 69DLU3; ISBN: 0-7334-1862-7
DOCUMENT TYPE: Conference
LANGUAGE: English
REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d l4 abs ibib 3-4

L4 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2003 ACS on STN
AB A membrane-electrode assembly for a fuel cell consists of an electrolyte sandwiched between electrodes that incorporate a catalyst layer and a **gas diffusion** layer, in which: (1) the catalyst layer comprises a catalyst-contg. conductive powder and a carbon fiber, and/or (2) the **gas diffusion** layer consists of a layer contg. a water-repellent polymer and a carbon fiber, in which at least a part of the surface of the **gas diffusion** comes into contact with the catalyst layer. A suitable catalyst is platinum or a platinum alloy. The conductive powder is typically a conductive carbon black or a carbonaceous powder (e.g., furnace black, Ketjen Black, channel black, etc.); carbon fibers are selected from PAN-based fibers, pitch-based fibers, **carbon nanotubes**, and vapor deposited fibers (optionally heat treated to >2000.degree.). The hydrophobic (water-repellent) polymer is typically a fluoropolymer (esp. PTFE).
ACCESSION NUMBER: 2002:539993 CAPLUS
DOCUMENT NUMBER: 137:111682
TITLE: Fuel cell membrane-electrode assembly containing catalyst layer, gas diffusion layer, carbon fibers,

and fluoropolymer water-repellent layer
INVENTOR(S): Yoshida, Tomoaki; Morita, Toshio
PATENT ASSIGNEE(S): Showa Denko K. K., Japan
SOURCE: PCT Int. Appl., 45 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002056404	A1	20020718	WO 2002-JP252	20020116
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
JP 2003115302	A2	20030418	JP 2002-3989	20020111
US 2003091891	A1	20030515	US 2002-49188	20020208

PRIORITY APPLN. INFO.:
JP 2001-7655 A 20010116
US 2001-267412P P 20010209
JP 2001-228825 A 20010730
US 2001-308855P P 20010801
WO 2002-JP252 W 20020116

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2003 ACS on STN
AB The electrode is prepd. by applying a catalyst-fibrous carbonaceous material dispersion on a carbon sheet to form a catalyst layer. The electrochem. device, e.g., an air battery or a fuel cell, is prepd. by attaching an electrolyte layer to a gas diffusion electrode having the above catalyst layer.
ACCESSION NUMBER: 2002:273011 CAPLUS
DOCUMENT NUMBER: 136:297431
TITLE: Manufacture of gas diffusion electrode and electrochemical device
INVENTOR(S): Kanemitsu, Toshiaki; Sato, Nobuaki; Imazato, Minehisa
PATENT ASSIGNEE(S): Sony Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002110178	A2	20020412	JP 2000-298852	20000929

PRIORITY APPLN. INFO.:
JP 2000-298852 20000929